

101826, 308

<<Table A from Declaration.Doc>>  
emailed 8-8-07 To: elizabeth Battin  
from: Jeffrey Schmidt

Copy of Table from  
Declaration filed 7/26/07

Table A is set forth on the following page

No.		P <sub>2</sub> O <sub>5</sub>	B <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	Li <sub>2</sub> O	Na <sub>2</sub> O	K <sub>2</sub> O	BaO	ZnO	TiO <sub>2</sub>	Nb <sub>2</sub> O <sub>5</sub>	Bi <sub>2</sub> O <sub>3</sub>	WO <sub>3</sub>	Total
BASE	Hayashi No.22	mol%	24.00	3.00	0.00	22.00	11.00	2.00	3.00	6.00	18.00	0.00	8.00	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	4.44	100.00
T2	Ti+2cat%	mol%	23.17	2.50	0.00	21.24	10.62	1.93	2.90	9.21	17.37	0.00	7.72	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	5.33	20.00	0.00	4.44	102.00
T4	Ti+4cat%	mol%	22.39	2.80	0.00	20.52	10.26	1.87	2.80	12.31	16.79	0.00	7.46	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	7.33	20.00	0.00	4.44	104.00
T6	Ti+6cat%	mol%	21.66	2.71	0.00	19.86	9.93	1.81	2.71	15.16	16.25	0.00	7.22	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	9.33	20.00	0.00	4.44	106.00
N2	Nb+2cat%	mol%	23.58	2.95	0.00	21.61	10.81	1.96	2.95	5.89	19.45	0.00	7.86	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	22.00	0.00	4.44	102.00
N4	Nb+4cat%	mol%	23.17	2.50	0.00	21.24	10.62	1.93	2.90	5.79	20.45	0.00	7.72	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	24.00	0.00	4.44	104.00
N6	Nb+6cat%	mol%	22.77	2.85	0.00	20.87	10.44	1.90	2.85	5.69	22.20	0.00	7.39	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	26.00	0.00	4.44	106.00
BASE	Hayashi No.22	mol%	24.00	3.00	0.00	22.00	11.00	2.00	3.00	6.00	18.00	0.00	8.00	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	4.44	100.00
W2	W+2cat%	mol%	23.17	2.50	0.00	21.24	10.62	1.93	2.90	5.79	17.37	0.00	11.20	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	6.44	102.00
W4	W+4cat%	mol%	22.39	2.80	0.00	20.52	10.26	1.87	2.80	5.60	16.79	0.00	14.16	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	6.44	104.00
W6	W+6cat%	mol%	21.66	2.71	0.00	19.86	9.93	1.81	2.71	5.42	16.25	0.00	16.97	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	10.44	106.00
B2	Bi+2cat%	mol%	23.58	2.95	0.00	21.61	10.81	1.96	2.95	5.89	17.68	1.77	7.86	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	2.00	4.44	102.00
B4	Bi+4cat%	mol%	23.17	2.50	0.00	21.24	10.62	1.93	2.90	5.79	17.37	3.47	7.72	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	4.00	4.44	104.00
B6	Bi+6cat%	mol%	22.77	2.85	0.00	20.87	10.44	1.90	2.85	5.69	17.08	5.12	7.59	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	6.00	4.44	106.00

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101826,308

<<Draft Declaration - 132 (06-08-07).  
emailed 8-8-07 To: elizabeth Bolden  
From Jeffrey Schmidt  
was submitted since electronic copy  
**PATENT APPLICATION**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Dec Date  
7/26/07

In re application of

Docket No: Q91049

Yasuhiro FUJIWARA, et al.

Appln. No.: 10/826,308

Group Art Unit: 1755

Confirmation No.: 1322

Examiner: Elizabeth A. BOLDEN

Filed: April 19, 2004

For: OPTICAL GLASS; PRESS-MOLDING PREFORM AND METHOD OF MANUFACTURING THE SAME; AND OPTICAL ELEMENT AND METHOD OF MANUFACTURING THE SAME

**DECLARATION UNDER 37 C.F.R. § 1.132**

Mail Stop Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Yasuhiro FUJIWARA, hereby declare and state:

THAT I am a citizen of Japan;

THAT I have received the degree of Masters in Chemistry in \_\_\_\_\_ (please insert year) from Keio University, Japan;

THAT I have been employed by HOYA Corporation since April 2000, where I hold a position as \_\_\_\_\_ (please insert job title here), with responsibility for research and development in the field of optical glasses;

THAT I am an inventor of the above-identified application;

THAT I am familiar with the above-identified application, and with US Publication 2002/0073735 to Hayashi et al.;

THAT I have conducted the following experiments to demonstrate the unexpectedly superior results of the presently claimed invention *vis-à-vis* Hayashi;

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## **EXPERIMENTAL REPORT**

### **I. Glass preparation**

Glass No. 22 described in Table 5 of Hayashi (US2002/0073735A1) was selected as a base glass. To the base glass, various amount of Bi<sub>2</sub>O<sub>3</sub>, WO<sub>3</sub>, Nb<sub>2</sub>O<sub>5</sub> or TiO<sub>2</sub> were added. The compositions of each glass prepared were shown in Table A.

In Table A, the abbreviation, "B2" means the glass that was prepared by adding Bi<sub>2</sub>O<sub>3</sub> to the base glass in an amount so that the resulting glass comprised 2 cationic percent of Bi<sup>3+</sup>. The same is true on the abbreviations, B4 and B6.

The abbreviation, "W2" means the glass that was prepared by adding WO<sub>3</sub> to the base glass in an amount so that the resulting glass comprised 2 cationic percent of W<sup>6+</sup>. The same is true on the abbreviations, W4 and W6.

The abbreviation, "N2" means the glass that was prepared by adding Nb<sub>2</sub>O<sub>5</sub> in an amount so that the resulting glass comprised 2 cationic percent of Nb<sup>5+</sup>. The same is true on the abbreviations, N4 and N6.

The abbreviation, "T2" means the glass that was prepared by adding TiO<sub>2</sub> to the base glass in an amount so that the resulting glass comprised 2 cationic percent of Ti<sup>4+</sup>. The same is true on the abbreviations, T4 and T6. However, Glass T2, T4 and T6 could not be prepared because they were not vitrified but crystallized.

Table A is set forth on the following page

**DECLARATION UNDER 37 C.F.R. § 1.132**  
**U.S. Application No.: 10/826,308**

Attorney Docket No.: Q91049

No.		P-O <sub>3</sub>	B-O <sub>3</sub>	SiO <sub>2</sub>	U-O	Na-O	K-O	BaO	TiO <sub>2</sub>	Nb <sub>2</sub> O <sub>5</sub>	Bi <sub>2</sub> O <sub>3</sub>	WO <sub>3</sub>	Total		
BASE	Hayashi No.22	mol%	24.00	3.00	0.00	22.00	11.00	2.00	3.00	6.00	18.00	0.00	8.00	100.00	
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	4.44	100.00	
T2	Ti+2cat%	mol%	23.17	2.90	0.00	21.24	10.62	1.93	2.90	9.27	17.37	0.00	7.72	100.00	
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	5.33	20.00	0.00	4.44	102.00	
T4	Ti+4cat%	mol%	22.39	2.80	0.00	20.52	10.26	1.87	2.80	8.80	12.31	16.79	0.00	7.46	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	7.33	20.00	0.00	4.44	104.00	
T6	Ti+6cat%	mol%	21.66	2.71	0.00	19.86	9.93	1.81	2.71	7.11	15.16	16.25	0.00	7.22	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	9.33	20.00	0.00	4.44	106.00	
N2	Nb+2cat%	mol%	23.98	2.95	0.00	21.61	10.81	1.96	2.95	2.95	5.89	19.45	0.00	7.86	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	22.00	0.00	4.44	102.00	
N4	Nb+4cat%	mol%	23.17	2.90	0.00	21.24	10.62	1.93	2.90	5.79	20.85	0.00	7.72	100.00	
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	24.00	0.00	4.44	104.00	
N6	Nb+6cat%	mol%	22.77	2.86	0.00	20.87	10.44	1.90	2.85	5.85	22.20	0.00	7.59	100.00	
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	26.00	0.00	4.44	106.00	
BASE	Hayashi No.22	mol%	24.00	3.00	0.00	22.00	11.00	2.00	3.00	6.00	18.00	0.00	8.00	100.00	
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	4.44	100.00	
W2	W+2cat%	mol%	23.17	2.90	0.00	21.24	10.62	1.93	2.90	5.79	17.37	0.00	11.20	100.00	
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	6.44	102.00	
W4	W+4cat%	mol%	22.39	2.80	0.00	20.52	10.26	1.87	2.80	5.80	16.79	0.00	14.18	100.00	
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	8.44	104.00	
W6	W+6cat%	mol%	21.66	2.71	0.00	19.86	9.93	1.81	2.71	7.11	15.16	16.25	0.00	16.97	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	0.00	10.44	106.00	
B2	Bi+2cat%	mol%	23.98	2.95	0.00	21.61	10.81	1.96	2.95	2.95	5.89	17.68	1.77	7.86	100.00
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	2.00	4.44	102.00	
B4	Bi+4cat%	mol%	23.17	2.90	0.00	21.24	10.62	1.93	2.90	5.79	17.37	3.47	7.72	100.00	
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	4.00	4.44	104.00	
B6	Bi+6cat%	mol%	22.77	2.86	0.00	20.87	10.44	1.90	2.85	5.85	17.08	5.12	7.59	100.00	
		cat%	26.67	3.33	0.00	24.44	12.22	2.22	1.67	3.33	20.00	6.00	4.44	106.00	

## **II. Evaluations of the glasses prepared**

Measurements of glass transition temperature, liquid phase temperature, refractive index (nd) and Abbé number (vd) were carried out with respect to Glasses B2, B4, B6, W2, W4, W6, N2, N4 and N6 that were successfully prepared.

Furthermore, in order to evaluate the glass stability, the above glasses were kept at 920 degrees Celsius to observe the glass and evaluate based on the following three-grade scale. This test will be referred to as "glass stability test", hereinafter.

A: No crystal was precipitated.

B: Some crystals were precipitated.

C: Glass was crystallized.

Results were shown in the following Tables.

Table B

Glass transition temperature Tg (°C)				
Cationic %	Bi	W	Nb	Ti
0	477(BASE)	477(BASE)	477(BASE)	477(BASE)
2	462.1(B2)	481.9(W2)	---	---
4	457.3(B4)	482.5(W4)	---	---
6	450.9(B6)	480.7(W6)	496.6(N6)	---

Table C

Liquid phase temperature LT(Tl)				
Cationic %	Bi	W	Nb	Ti
0	900(BASE)	900(BASE)	900(BASE)	900(BASE)
2	904(B2)	905(W2)	---	---
4	918(B4)	913(W4)	---	---
6	927(B6)	926(W6)	1008(N6)	---

**Table D**

Results of glass stability test					
Cationic %	Bi	W		Nb	
0	A		A		A
2	A		A		C
4	A		A		C
6	B		B		C

**Table E**

Cationic %	Bi		W		Nb	
	nd	vd	nd	vd	nd	vd
0	1.82121	24.01	1.82121	24.01	1.82121	24.01
2	1.83970	23.44	1.83306	23.45	1.83673	23.33
4	1.85624	22.97	1.84419	23.00	1.85044	22.79
6	1.87114	22.57	1.85450	22.56	1.86509	22.22

### **III. Results**

#### **(1) Glass transition temperature**

As described in [0003] of the Specification of the present application, lower glass transition temperature is preferred when the glass is employed for precision press molding.

As shown in Table B, Glasses B2, B4 and B6 exhibited lower glass transition temperatures than glasses to which  $\text{WO}_3$  or  $\text{Nb}_2\text{O}_5$  was added instead of  $\text{Bi}_2\text{O}_3$ . From these results, it can be concluded that Glasses B2, B4 and B6 in which  $\text{Bi}_2\text{O}_3$  is included are suitable for use in precision press molding.

#### **(2) Glass stability**

The lower the liquid phase temperature, the better the glass stability. As shown in Table C, Glasses B2, B4 and B6 exhibited lower liquid phase temperature than glasses to which  $\text{WO}_3$  or  $\text{Nb}_2\text{O}_5$  was added instead of the same amount of  $\text{Bi}_2\text{O}_3$ .

Furthermore, as shown in Table D, glasses to which  $\text{Bi}_2\text{O}_3$  was added exhibited good results in the glass stability test.

From these results, it can be concluded that glasses to which  $\text{Bi}_2\text{O}_3$  was added have good glass stability.

**(3) Optical properties**

As shown in Table E, Glasses B2, B4 and B6 exhibited high Abbé numbers ( $\text{vd}$ ), that is, high dispersion. Furthermore, Glasses B2, B4 and B6 exhibited higher refractive index than glasses to which  $\text{WO}_3$  or  $\text{Nb}_2\text{O}_5$  was added instead of the same amount of  $\text{Bi}_2\text{O}_3$ .

**IV. Conclusion**

In general, when the content of glass component imparting high refractive index to the glass is increase to obtain glass having high refractive index, the glass obtained tends to exhibit deteriorated glass stability, increased liquid phase temperature. As shown in the experimental results,  $\text{Nb}_2\text{O}_5$  and  $\text{TiO}_2$  are such components.

However, as shown above,  $\text{Bi}_2\text{O}_3$  and  $\text{WO}_3$  can impart high refractive index to the glass without deterioration of the glass stability.

Furthermore, among  $\text{Bi}_2\text{O}_3$  and  $\text{WO}_3$ ,  $\text{Bi}_2\text{O}_3$  can remarkably increase the refractive index of the glass as well as decrease the glass transition temperature.

From these results, it can be concluded that addition of  $\text{Bi}_2\text{O}_3$  yields unexpected results in that optical glass that exhibits high refractive index and high dispersion, as well as possesses excellent stability and is suitable for use in precision press molding property can be obtained.

**DECLARATION UNDER 37 C.F.R. § 1.132**  
**U.S. Application No.: 10/826,308**

**Attorney Docket No.: Q91049**

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: \_\_\_\_\_

Yasuhiro FUJIWARA